REMARKS

This communication is a full and timely response to the non-final Office Action dated February 15, 2006. A petition to extend the time for this response to within the first extended month accompanies his submission.

Priority Acknowledgement

It is appreciated that the Action acknowledged the claim for priority and noted that all of the certified copies in support of the priority claim were submitted.

Claims

Claims 11, 12, 17, 18, 27, 28, 39, 40, 53, 54, 63, 65, 73, and 74 as previously amended were presented for examination in this RCE.

Rejection of Claims under 35 USC §112 (First paragraph)

All of the pending claims as noted above were rejected, as stated in section 2 and 3 of the Action, as failing to comply with the written description requirement. The examiner contended that the specification does not support the amended claims in that it describes the irradiation converted substrate having a particle diameter that is larger than a non-irradiated substrate, not a smaller particle. It seems that this rejection should only have been posited as to claims 11, 12, 17, 18, 27 and 28. Accordingly, these claims are amended to accommodate this reversal of the stated limitation and withdrawal of the rejection is in order.

The offending limitation regarding particle diameters is not apparently used in claims 40, 53, 54, 63, 65, 73, and 74. As to the rejection made to these claims, it is respectfully traversed as inadvertent and misplaced, so that withdrawal of the rejection is in order.

Rejection of Claims 17 and 18 under 35 USC §112 (Second paragraph)

Claims 17 and 18 were held to have some antecedent basis difficulties as stated in sections 4 and 5 of the Action. These claims are amended to overcome the stated rejection. Withdrawal is respectfully submitted to be in order.

Rejection of claims 11, 27, 39, 3, 63 and 73 as anticipated by Noguchi

This rejection appears to depend on the section 112 rejection at least as to claims 11, 12, 17, 18, 27 and 28 and should thus be withdrawn because that rejection is overcome above. A second point is that the limitation regarding the processing of the semiconductor thin film in the applicable rejected claims as a product-by-product limitation. The applicable claims are thus rejected to refer to the film as accumulated without exposing the substrate to air. This limitation is submitted to avoid any product-by-product allegation. In addition, other claims are similarly amended so that none of the pending claims is subject to this observation, noting that claim 28 for example has a thickness limitation for the accumulation limitation.

The allegation that irradiation and cooling in claims 39 and 73 are respectively limitations on the product best stated by the process and thus permissible.

When weight is given to all of the limitations and all of the pending claims are viewed in their entireties as required, the anticipation rejection over Noguchi is overcome for at least these reasons and for the more detailed reasons previously presented and herein incorporated by reference and explicitly.

Section 103 Rejections

In the first instance, the section 103 rejections should be withdrawn because the section 112 rejections of claims 11, 12, 17, 18, 27 and 28 are overcome. Secondly, the combination is not supported by an adequate factual finding for a motivation to make the combination; rather the alleged reasons for obviousness are conclusory rather than factual. Thirdly, claim language is amended to overcome a product by process holding, as discussed above. Thus, each of the section 103 rejections is inapt and should be withdrawn when each claim is considered in its entirety..

As previously pointed out, each of claims 11 and 12 have been amended to recite that said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger (as amended) than said first particle diameter; a thin film transistor integrated in said prescribed region through said semiconductor thin film, wherein said converted polycrystalline silicon semiconductor film has a single-shot irradiated region. Support for the subject matter recited in these claims can be found variously throughout the claims, for example, in original claims 11 and 12 where applicable. No new matter has been added.

Each of claims 17, 18, 27, and 28 had been amended to recite that said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger, as amended, than said first particle diameter. Support for the subject matter recited in these claims can be found variously throughout the claims, for example, in original claims 17, 18, 27, and 28 where applicable. No new matter has been added.

Claims 39 and 40 had been amended to recite that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns. Support for the subject matter recited in these claims can be found variously throughout the claims, for example, in original claims 39 and 40 where applicable. No new matter has been added.

Claim 53 had been amended to recite that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere. Support for the subject matter recited in claim 53 can be found variously throughout the claims, for example, in original claim 53. No new matter has been added.

Claim 54 has been amended to recite that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns. Support for the subject matter recited in claim 54 can be found variously throughout the claims, for example, in original claim 54. No new matter has been added.

Claims 63 and 65 had been amended to recite that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated

with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated. Support for the subject matter recited in these claims can be found variously throughout the claims, for example, in original claims 63 and 65 where applicable. No new matter has been added.

Claims 73 and 74 had been amended to recite that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature. Support for the subject matter recited in these claims can be found variously throughout the claims, for example, in original claims 73 and 74 where applicable. No new matter has been added.

Claims 11, 12, 17, 18, 27, 28, 39, 40, 53, 54, 63, 65, 73, and 74 are pending where all of these claims are independent.

Arguments regarding Rejection Under 35 U.S.C. §102

Claims 11, 27, 39, 53, 63, and 73 were again rejected under 35 U.S.C. §102(b) as anticipated by *Noguchi et al.*—U.S. Patent No. 5,529,951. Applicant respectfully traverses this rejection.

Claim 11 recites a thin film semiconductor device comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating thin film, wherein said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is smaller than said first particle diameter; a thin film transistor integrated in said prescribed region through said semiconductor thin film, wherein said converted polycrystalline silicon semiconductor film has a single-shot irradiated region, and a cross sectional shape of said energy beam is adjusted with respect to said prescribed region to consist of irradiating said prescribed region in its entirety at a time by a single shot irradiation, so that characteristics of said thin film transistor are made uniform; and whereby said single-shot

irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing said substrate to air, to accumulate said semiconductor thin film.

Claim 27 recites a thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating thin film, wherein said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger as amended than said first particle diameter; and said semiconductor thin film is accumulated by alternately repeating said film forming step and said irradiation step without exposing said substrate to the air; and whereby said irradiated region is a borderless irradiated region.

Claim 39 recites a thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns; and a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon; and whereby said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing the substrate to air.

Claim 53 recites a thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere; and whereby

said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing said semiconductor thin film to air.

Claim 63 recites a thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated; and whereby said irradiated region is a borderless irradiated region; and wherein said film forming step and said film is accumulated without exposing said substrate to air, to accumulate said semiconductor thin film.

Claim 73 recites a thin film transistor having a laminated structure comprising a semiconductor thin film, a gate insulating film accumulated on one surface thereof, and a gate electrode accumulated entirely within a prescribed region of said semiconductor thin film through said gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature; and whereby said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing the substrate to air film.

In summary, claims 11 and 27 recite that said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger (as amended) than said first particle diameter; claim 39 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light

having an emission time width from upstand to downfall of at least 50ns; claim 53 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere; claim 63 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated; and claim 73 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature.

Noguchi, as understood, discloses a method of forming a polycrystalline silicon thin film where an amorphous silicon layer of a thickness preferably of 30 nm to 50 nm is formed on a substrate. Next, substrate heating is performed to set the amorphous silicon layer to preferably 350° C. to 500° C., more preferably 350° C. to 450° C. Then, at least the amorphous silicon layer is irradiated with laser light of an excimer laser energy density of 100 mJ/cm^2 to 500 mJ/cm^2, preferably 280 mJ/cm^2 to 330 mJ/cm^2, and a pulse width of 80 ns to 200 ns, preferably 140 ns to 200 ns, so as to directly anneal the amorphous silicon layer and form a polycrystalline silicon thin film. *See* Abstract.

Noguchi, however, fails to disclose, teach, or suggest at least that said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger than said first particle diameter as recited in claims 11 and 27; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, <u>said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns</u>, as recited in claim 39;

that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere, as recited in claim 53; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated, as recited in claim 63; and that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature, as recited in claim 73. In fact, *Noguchi* fails to disclose or suggest a semiconductor film structure as recited in the above-identified claims.

To properly anticipate a claim, the document must disclose, explicitly or implicitly, each and every feature recited in the claim. *See* Verdegall Bros. v. Union Oil Co. of Calif., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). *Noguchi* fails to disclose, teach, or suggest every element recited in independent claims 11, 27, 39, 53, 63, and 73, therefore these claims are not anticipated by *Noguchi*. Accordingly, Applicant respectfully requests that the rejection of claims 11, 27, 39, 53, 63, and 73 under 35 U.S.C. §102 be withdrawn, and these claims be allowed.

Arguments against the Rejections Under 35 U.S.C. §103

Claims 12, 28, 40, 54, 65, and 74 were again rejected under 35 U.S.C. §103(a) as unpatentable over *Noguchi* in view of *Tanaka et al.*—U.S. Patent No. 5,798,744. Applicant respectfully traverses this rejection.

Claim 12 recites a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a

thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger, as amended, than said first particle diameter; a thin film transistor integrated in said prescribed region through said semiconductor thin film wherein said converted polycrystalline silicon semiconductor film has a single-shot irradiated region; and a cross sectional shape of said energy beam is adjusted with respect to said prescribed region to consist of irradiating said prescribed region in its entirety at a time by a single shot irradiation, so that characteristics of said thin film transistor are made uniform; and whereby said single-shot irradiated region is a borderless irradiated region; and wherein said film forming step and said irradiating step are alternately repeated without exposing said substrate to air, to accumulate said semiconductor thin film.

Claim 28 recites a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger as amended than said first particle diameter; and said semiconductor thin film is accumulated by alternately repeating said film forming step, where each additional formed film is about 1 nm, and said irradiation step without exposing said substrate to the air; and whereby said irradiated region is a borderless irradiated region.

Claim 40 recites a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a

semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns, a desired change to said energy intensity of said laser light from upstand to downfall of said pulse is applied to said polycrystalline silicon; and whereby said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing said substrate to air, to accumulate said semiconductor thin film.

Claim 54 recites a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns, whereby said irradiated region is a borderless irradiated region; and wherein said film forming step and said irradiating step is accumulated without exposing said substrate to air, thus to accumulate said semiconductor thin film.

Claim 65 recites a display device comprising a pair of substrate adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrate comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor comprises a semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an

emission time width of at least 50ns when said substrate is uniformly heated, whereby said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing said substrate to air, to accumulate said semiconductor thin film.

Claim 74 recites a display device comprising a pair of substrates adhered to each other with a prescribed gap, and an electrooptical substance maintained in said gap, one of said substrates comprises a counter electrode, the other substrate comprises a pixel electrode and a thin film transistor driving said pixel electrode, and said thin film transistor comprises a semiconductor thin film and a gate electrode accumulated entirely within a prescribed region of one surface of said semiconductor thin film through a gate insulating film, wherein said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns when said substrate is cooled to a temperature lower than room temperature, whereby said irradiated region is a borderless irradiated region; and wherein said film is accumulated without exposing said substrate to air, to accumulate said semiconductor thin film.

In summary, claim 12 recites that said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger as amended than said first particle diameter; claim 28 recites that said semiconductor thin film includes polycrystalline silicon having a first particle diameter, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is smaller than said first particle diameter; claim 40 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns; claim 54 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon

corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns; claim 65 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated; and claim 74 recites that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature.

As discussed above, *Noguchi* discloses a method of forming a polycrystalline silicon thin film where an amorphous silicon layer of a thickness preferably of 30 nm to 50 nm is formed on a substrate. Next, substrate heating is performed to set the amorphous silicon layer to preferably 350° C. to 500° C., more preferably 350° C. to 450° C. Then, at least the amorphous silicon layer is irradiated with laser light of an excimer laser energy density of 100 mJ/cm^2 to 500 mJ/cm^2, preferably 280 mJ/cm^2 to 330 mJ/cm^2, and a pulse width of 80 ns to 200 ns, preferably 140 ns to 200 ns, so as to directly anneal the amorphous silicon layer and form a polycrystalline silicon thin film. The Office Action acknowledges that *Noguchi* fails to disclose, teach, or suggest at least a display device as recited in the above-identified claims, and relies on *Tanaka* to remedy this deficiency.

Applicant adds that *Noguchi* also fails to disclose, teach, or suggest at least that said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger as amended than said first particle diameter as recited in claims 12 and 28; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, <u>said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns</u>, as recited in claim 40; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm

layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere, as recited in claim 54; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated, as recited in claim 65; and that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature, as recited in claim 74.

Tanaka discloses a liquid crystal display apparatus has a pair of substrates, at least one of which is transparent, and a liquid crystal layer formed by enclosing a liquid crystal composition between the pair of the substrates, wherein a display region having a plurality of first semiconductor elements which are arranged in a matrix, and a peripheral circuits region having a plurality of second semiconductor elements for driving said plurality of first semiconductor elements, arranged at the periphery of the display region, are formed on the one substrate of said pair of substrates, and driver circuits for driving the peripheral circuits are bonded at a designated region on the one substrate of the pair of substrates. *See* Abstract.

Tanaka, however, fails to remedy the deficiencies of *Noguchi* and in particular, fails to disclose, teach, or suggest at least the above-identified elements recited in claims 12, 28, 40, 54, 65, and 74.

In summary, *Noguchi* and *Tanaka* either singly or combined fail to disclose, teach, or suggest at least that said polycrystalline silicon is an irradiation converted substrate that in the prescribed region has a 30 to 80 nm layer of amorphous silicon or polycrystalline silicon having a second particle diameter that is larger as amended than said first particle diameter as recited in claims 12 and 28; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional

area of the substrate irradiated with pulse laser light having an emission time width from upstand to downfall of at least 50ns, as recited in claim 40; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns in a non-oxidative atmosphere, as recited in claim 54; that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is uniformly heated, as recited in claim 65; and that said semiconductor thin film includes polycrystalline silicon, wherein said polycrystalline silicon is an irradiation converted substrate having a 30 to 80 nm layer of non-single crystal silicon, said converted polycrystalline silicon corresponds to a cross-sectional area of the substrate in the prescribed region that is irradiated with pulse laser light having an emission time width of at least 50ns when said substrate is cooled to a temperature lower than room temperature, as recited in claim 74. In fact, the combined references fail to disclose a semiconductor film structure as recited in the above-identified claims. Thus, a *prima facie* case for obviousness has not been established.

To establish *prima facie* obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Moreover, obviousness "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." ACS Hosp. Sys. V. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). For at least the above reasons, Applicant respectfully requests that the rejection of claims 12, 28, 40, 54, 65, and 74 under 35 U.S.C. §103 be withdrawn, and these claims be allowed.

Conclusion

Based on at least the foregoing amendments and remarks, Applicant submits that claims 11, 12, 17, 18, 27, 28, 39, 40, 53, 54, 63, 65, 73, and 74 are allowable, and this application is in condition for allowance. Accordingly, Applicant requests a favorable examination and consideration of the instant application. In the event the instant application can be placed in even better form, Applicant requests that the undersigned attorney be contacted at the number listed below.

This amendment is responsive to the non-final Official Action mailed February 15, 2006. Reexamination and reconsideration are respectfully considered.

Dated: June 15, 2006

Respectfully submitted,

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